BUSS, INC.
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April 19, 1993

Ms, Donna Searcy
Federal Communications Commission
1919 M St. N.W.
Room 222
Washington, DC 20554

93-7

Attention: Secretary of the FCC.

Subject: Reply Comments to the Notice of Inquiry, In the Matter of Implementation of Section 17 of the Cable Television Protection and Competition Act of 1992; Compatibility Between Cable Systems and Consumer Electronic Equipment, ET Docket 93-7, FCC 93-30, Adopted Jan. 14, 1993.

Sincerely,

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April 15, 1993

To: Federal Communications Commission
Subject: Reply Comments to ET Docket 93-7, FCC 93-30
Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992.

OVERALL OBJECTIVES

Objectives of the Cable Act of 92 should include ensuring cable and consumer interface compatibility, protecting competitive technologies, maintaining high picture quality technical standards, protection against aircraft interference, encouraging optoelectronic advanced technology between consumers and making cable service available to every residential dwelling in each cable franchise area.

As U.S. Senate Bill 1200, sponsored by Senators Conrad Burns and Robert Dole and now Vice President Albert Gore, stated, "Telecommunications requires...the rapid development of a nationwide, advanced, interactive, interoperable broadband communications infrastructure to every business, educational and health care institution and home in America."

Multimedia integrated "last mile" switched distribution capability* is available today that can supplement existing CATV systems to provide consumers with two-way, universal access, full-motion fine definition video plus the simultaneous transmission of giga speed data - with privacy, access and cost comparable to local telephone service. Analog signals of NTSC quality will be transmitted to and from analog TV sets and VCRs while digital signals interconnect computers and future telecomputers.

Optical fiber transmission to broadband switched distribution centers could provide each household with a choice among many hundreds of television impulse-pay-per-view channels for video-on-demand information retrieval and near-video-on-demand for a choice of a hundred movies - each transmitted at 15 minute intervals.

Consumer interface problems and degraded picture quality will increase with the delivery of VOD and NVOD by CATV systems using digitally switched transmission and compressed video terminals. Multiple technical standards would be needed by the FCC to regulate acceptability of various levels of video compression.

Analog TV sets are essential for low-cost, 2-W consumer video applications that include telecommuting, telework centers, mainstreaming the disabled for education and high level jobs, government, medical and social services, rural community development and helping revitalize inner cities.

* Bidirectional Unicable Switching System, U.S. Patent #4,077,006
* Remote Switching & Processing Converters U.S. Patent #4,901,367

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CATV + BUSS = 21st CENTURY TELECOMMUNICATIONS

The combination of 1) existing CATV systems for one-way Basic and Satellite monthly pay tiers of service plus 2) BUSS broadband switched distribution for 1000 channels of impulse-pay-per-view and two-way full motion video, and 3) privacy, access and cost comparable to local telephone service - will usher in an age of advanced multimedia consumer oriented personal television.

CATV unscrambled channels will meet the goal of the Electronic Industries Association's Consumer Electronics Group for "promoting simultaneous 'in the clear' access to all authorized channels delivered to the home." This could incorporate interdiction for the Satellite group of channels. Similarly, the hundreds of impulse-pay-per-view channels will surely meet the goal of the National Cable Television Association that addressable scrambling "may be the only technology flexible enough to allow cable operators" to comply with must-carry and buy-through provisions of the Cable Act.

Adding BUSS switched distribution to an existing cable system will 1) involve installation of"last mile" Switching Control Centers, 2) assigning a dedicated receive and a transmit channel to each subscriber, and 3) connect each user via a frequency-division coaxial cable to their personal Remote Switching and Processing Converter in the SCC. All pay channels could be transmitted from the headend via optical fibers to all SCCs. Each request for a pay channel could trigger a fee so descrambling converters are unneccesary and converter piracy is eliminated.

Two-way full-motion, low-cost video and mega-speed data become available to all households by time-sharing local optical fiber trunk cables to distant SCCs. For example, modulating a single-mode fiber laser for one or 80 video channels is $8000 so it is cost-effective for 80 users to use the same laser and fiber simultaneously and for hundreds to time-share them daily.

Additional trunk and feeder cables would be installed for BUSS applications. For existing dual cable systems, all CATV services could be provided on one cable and the second used for BUSS trunk and feeders. In addition to providing many important services to consumers, the additional income from two-way video could double existing CATV system cash-flow.

CATV systems can be upgraded with the patented BUSS switched distribution using either analog or digital technology. However, analog picture quality will be superior, cost of installation less, time-frame shorter and two-way universal access between users will become a reality. Digital technology is inferior when used for connecting analog video terminals within a community.

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CABLE SYSTEM DESIGN

CATV tree and branch system design is unexcelled for one-way transmission of a limited number of television channels at low cost from a point source to tens of thousands of subscribers in areas of high household density with high technical standards of picture quality. Direct pickup is minimized by use of set converters.

Cable Basic and Monthly tiers of satellite service are consumer friendly as pictures are not scrambled. The limited number of channels eliminates the need to send signals in the aircraft spectra.

However, for pay-per-view applications, the design encourages 1) converter piracy and short time obsolescense of descrambling converters located in or near the household, 2) consumer frustration over limitations to their use of VCRs, remote controls and TV sets, and 3) signal reflections from cables and equipment in the home.

CATV one-way tree design has prevented transmission of two-way, low-cost video between consumers since the early 70s. The dreams of the Sloan, Friendly, Rostow, etc. Commissions for a Wired City died with the advent of satellite pay programs. Promises of two-way, trunk-only Institutional Networks helped cable companies secure lucrative metropolitan area franchises without delivering two-way video between subscribers.

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CATV OPTOELECTRONIC DISTRIBUTION

CATV leaders welcome prospects of one-way video interactive delivery, via optical fibers, of more than 500 television channels for information retrieval, video-on-demand movies, advertisements, home shopping, access to libraries, education, games, etc. Their strategies focus only on downstream capabilities.

OPTICAL FIBER TRANSMISSION

Today, 1550nm single-mode hair-thin optical fibers can each transmit 80 NTSC quality television channels making it cost-effective to transmit hundreds of analog and/or digital modulated channels from a headend to all cable subscribers. Optical fibers enable transmission of both NTSC and HDTV quality pictures to TV receivers while simultaneously transmitting giga-speed data for computers. Multimedia integrated telecommunication capability is here.

CATV ANALOG TRANSMISSION LIMITATIONS

However, CATV analog transmssion design introduces problems. Bypassing trunks with fiber-to-the-feeder design would still not enable transmission of hundreds of channels via existing feeder cables and line extenders. The fiber-to-the-curb design is also deficient in storing, descrambling, interdicting and selecting a choice of programs. There would be consumer generated reflections, co-channel interference, interface and converter piracy problems.

Consumer interface compatibility and high level picture quality standards will be of paramount importance in serving consumer future large screen TV sets and home entertainment centers. As a minimum, cable systems should meet FCC's present CATV performance standards.

PROJECTED CATV DIGITAL TRANSMISSIONS

To overcome CATV analog system design limitations, cable industry leaders project digital transmission of hundreds of interactive television channels - one-way video and upstream data control signals.

Digital transmission requires about 4 times the bandwidth of analog to deliver comparable full-motion, broadcast quality pictures. Instead, proposals are being made that the digital bandwidth be reduced by an 8:1 factor for television and movies and by 4:1 for

COMPRESSED VIDEO

The proposed reduced bandwidth digital transmissions will be converted to compressed video with associated degraded picture quality, loss of fine detail and blurring of motion. Tests in Boulder Colo. households found that digital micro-reflections over home wires were sufficient to drive bit error rates of digital signals above acceptable levels. Multiple FCC picture quality standards for various levels of compression for television reception would be needed.

Two-way compressed video terminals do not come cheap. PictureTel Corp. a leader in the video-conferencing market, offers a two-way video system at $24,990 per color or $19,900 per monochrome terminal. Each terminal includes a 20 inch monitor, video camera and an electronic package in a desk-side box. The system is cost-effective for video-conferencing between government agencies and top 500 corporations. The products are not consumer oriented.

Digital transmission to subscriber terminals, digital switching, addressable descrambling, digital to various levels of compressed video terminals, and probable high cost, will pose problems. There could also be interference to other services and incompatibility with VCRs and other TV sets. Subscribers wishing this wide choice

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BUSS COST-EFFECTIVE CABLE SYSTEM EXTENSIONS

As pointed out by Maryland Delegate James E. Proctor Jr. in House Bill 1326, county cable television franchise agreements should "require that the operator of the franchise agree to make cable television service available in a timely manner and at reasonable cost, to every residential dwelling unit in the operator's service territory in the county..." (emphasis added)

In Prince George's County, Metrovision and Multivision justify their lack of service to areas where household density is less than 30 homes per mile by claiming that system extensions cost $18,000 to $25,000 per mile (Montgomery Journal, 3/10/93) so equal access would not be cost-effective. This is true only if extensions used existing one-way tree design that requires dual-trunks and dual feeders, with amplifiers spaced at about 2000 feet intervals

However, low household density switched system extensions, that include two-way fine-definition video and mega-speed data, can be installed for less than $5000 per mile. BUSS patented "inverse spectrum design" for low household density areas, eliminates the need for additional dual-cable trunks and uses single cable feeders that extend for more than two miles without line extenders.

This switched system is certainly cost-effective. The 2-Way universal-access capability throughout the extension area, could more than double the present CATV return of $25 per month per user by adding telecommuting, social, medical and educational services. Disabled students could be mainstreamed with their classmates and disabled adults mainstreamed for high level jobs.

Later, CATV systems will upgrade their existing plant with BUSS Switched System design to offer all subscribers a choice of hundreds of channels of movies and information retrieval plus 2-Way; all with privacy, access and cost comparable to local telephone service.

BTV - RURAL CABLE

The combination of an optical fiber highway supplemented with BTV's "last mile" Rural Area Network (RAN) can efficiently pool diverse users with low-cost universal-access two-way fine definition video/audio plus mega-speed data. It provides economies of scale for rural residents and makes feasible "America's Office of the Future - your Rural Home".

The use of BUSS patented feature "Inverse Spectrum" will bring - full motion video (not just still pictures) and state-of-the-art graphics with the added concepts of privacy and interactivity - to rural America to make it fully competitive economically with urban living. This can be provided at low cost to each home even in areas where the household density is only 10 homes per mile. This compares with one-way CATV service where cable operators hesitate to wire areas with a density of less than 30 homes per mile.

BTV assigns each user two private television channels on a coaxial feeder cable - one for transmission and the other for reception. Cable loss through cable is highest at the highest television frequencies. Therefore BTV assigns the lowest TV channels to the most distant users. Residents more than two miles distant from a switching center can be served without the need for amplifiers enroute. Contrast this with CATV where the distance limiting factor is about 2000 feet between amplifiers, limited by the cable loss at the highest frequency channel and the insertion loss of multiple subscriber taps.

For rural residents where household densities approach one home per mile, BTV Rural Offices could be installed in a school, commercial or government facility. There could be low-cost time-shared rental of TV, computer, fax, printer, video camera and the communication system. This centrally-based work center will encourage small home-based businesses and provide access to residents for educational, medical & social services.